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Zero Retries is an independent newsletter about technological innovation in Amateur Radio. Zero Retries promotes Amateur Radio as (literally) a license to experiment with radio technology.

About Zero Retries

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Request To Send

It's Hamcation 2023 weekend in Orlando, Florida, USA. Wish I was there with you - enjoy some sunshine for me 😎

It's impressive to me that there is so much software development going on in Amateur Radio, including apps. A few that quickly came to to mind are:

- RadioMail
- aprs.fi
- SDRconnect
- VarAC

Something these all have in common is that, to some extent, they are "front ends" for an underlying system. aprs.fi and RadioMail run on Apple IOS devices and communicate via Bluetooth Low Energy to an Amateur Radio device, such as the new TNC4 from Mobilinkd (see below).

It's become increasingly common for Amateur Radio software to provide an Application Programming Interface (API) that allows other software to communicate at a "machine level" and extend capabilities. For example, because VARA FM and VARA HF provide a reasonably documented API, the VarAC chat / email / file transfer app work well, despite the two applications being developed separately by different authors. Another example is Microblog Server using the API of JS8Call (see below).

I think this trend is the wave of the present, freeing those with specialized talent to do what they best - design hardware, design basic software support with APIs, thus enabling those with design skills such as Georges Auberger WH6AZ (RadioMail) and Irad Deutsch 4Z1AC (VarAC) to do what *they* do best - intuitive design of user-facing software.

In *so* many ways, Amateur Radio is in a golden era of technological innovation, as you'll see below.

de Steve N8GNJ

The Next Project - Black Box Radio for 160m - 70cm

I was unaware of the radioartisan mailing list, and Anthony Good K3NG's announcement of (his) The Next Project until I was alerted to it by Curt Mills WE7U. I'm now a subscriber of that list. I'm sure there are some real gems buried in the extensive prior discussions.

… I am embarking on a new hardware and software development project. I am building and documenting a homebrew SDR rig inspired by and derived from the sBitx. The specifications I currently have in mind:

- 160 m to 70 cm - Si5351 VFO.
- Raspberry Pi core, with commercially-available touch screens supported.
- An Atmel AVR interfaced with the Pi to provide keyer functionality, Si5351 DDS I2C, and analog readings like forward and reverse power. AVR firmware will be updateable by the Pi in-circuit.
- Provisions to add additional AVRs for future functionality, like an autotuner.
- 10 watts TX, with a very clean output and interfacing suitable for driving external linear amplifiers.
- “Transverter friendly”
- *Superb* full QSK CW performance.
- I and Q Outputs.
- Access to Pi GPIO for external interfacing.
- K1EL Winkey emulation implemented in the Pi.
- Interfacing with Linux programs like FLDIGI.
- Modular design with core control and SDR functionality in one software component and GUI functions in another component. This will allow "headless" operation and easy development of alternative GUIs. IP socket based API between GUI and core.
- Ethernet and USB ports, as provided by the Pi, and of course the entire Pi ecosystem of hardware and enhancements available.
- Beyond the DDS, AVR, and audio codec chips, use all discrete commonly-available components to avoid supply chain and unobtanium parts issues in the future.
- "Human readable" core API communications and Pi / AVR communications

Followup:

My first big milestone or goal is to have the rig working "headless" with no GUI. Basically, you telnet to it and issue commands for the frequency, filters, setting various things, etc. and you hear received audio and can transmit. I've been working on the tcp server today. I'm reusing a good bit of sBitx code and have spliced this tcp server into one of the backend sBitx functions.

> GUIs will be separate executables that establish a telnet connection to the main executable. So one can run whatever GUI they want, or even multiple GUIs simultaneously. This will also work well for building web control, or a REST API, etc.
>
> To get a GUI going quickly, I may just take the sBitx GTK+ GUI code out to a separate executable and splice in a telnet function to have it connect with the core. The sBitx GUI is cleverly written, but I'm probably going to build something new later.

This project was interesting, but conclusively crossed the *Zero Retries Interesting* threshold by mentioning that a goal was a single radio that spanned frequencies from 160 meters (1.8 - 2.0 MHz) to 70 centimeters (420 - 450 MHz). Also, that this project will not feature an integral display - the long sought "black box" radio.

It was interesting to read this email thread There's ample prior open source art on which to base this project, and there seem to be some interesting offers of help and collaboration.

ZR > BEACON

AREDN at SCALE 20x - Amateur Radio Meets Linux on Linux Turf

> For the last few years, AREDN has had a booth on the expo floor at SCALE, the Southern California Linux Expo. It's happening again at the 20th annual SCALE, March 9th through 12th (https://www.socallinuxexpo.org/scale/20x), at the Pasadena Convention Center. The Expo runs from Friday afternoon until Sunday afternoon, and the AREDN booth will be manned with knowledgeable AREDN users, including Tim KN6PLV, one of the principal AREDN developers.

This is promoting Amateur Radio in the 21st Century!

New 222-225 MHz Mobile Radio from Alinco?

In the past week I saw some mentions of a new Alinco DR-CS25 radio for the US Amateur Radio 222-225 MHz band. I got my hopes up thinking that Alinco might have included connections for flat audio as they did with their popular, but now discontinued DR235T/EMkIII radio. There's no overt reference to flat audio being available on the DR-CS25… but there is an intriguing connector shown in the Instruction Manual in Section 3, Getting Acquainted, Rear Panel. The diagram shows a small trapezoidal shaped connector labeled:

Repeater Terminal - Terminal for repeater connection.

There is no other mention of this connector in the manual. I haven't seen anything that indicates this radio is actually shipping, so it's probably premature to query Alinco about the function of this connector.

Mobilinkd TNC4

Good news - the Mobilinkd TNC4 is now shipping.
Bad news - it's apparently *quite* popular. Per https://mastodon.radio/@Mobilinkd:

> Sold out of TNC4 in under 2 days. Will have more in March. And then more in April.

There seems to be a lot of the "sold out of TNCs" going around 😄

Newly Supported AREDN Devices Need Field Testing

From AREDN Ambassador Orv Beach W6BI on the socal-hamnet-users mailing list:

> The following 802.11ac devices were added in a recent nightly build. If you're using one of [these devices] successfully, please let the AREDN devs know. Or, if you're planning on buying more equipment soon, please consider one of these for your purchase. While [these devices] work in a testing environment, the AREDN devs are reluctant to include them in the next production build without evidence of them working in the field:
>
> - LiteBeam AC5 Gen2
> - MikroTik RBLHGG-5acD
> - NanoStation AC 5
> - NanoBeam AC 5 Gen 2
> - NanoBeam AC 5 (WA)
> - NanoBeam AC 5 (XC)

SDR Scanner Listens to Everything (HACKADAY)

> In the old days, scanners would listen to a bunch of channels in a round-robin fashion. If a signal breaks the squelch, the scanner stops and scanning continues scanning after a few seconds of inactivity. But with modern SDRs, you don't have to listen to one channel at a time. You can listen to all of them. [Tech Minds] shows RTL SDR Scanner on Linux to record up to 20 MHz of the band simultaneously. It records all the channels in the band of interest. The actual project is on GitHub.

This article is a pointer to a video on the Tech Minds YouTube channel - RTL SDR Scanner - FULL Bandwidth Recording With WEB UI. Tech Minds is subtitled "Ham Radio - SDR - RF Projects - Software - Tutorials" - what's *not* to love about this channel?

RadioMail 1.1 Adds Digipeating

I received this from a notification list with no corresponding web page, so the link is to an article on Mac Ham Radio that features this announcement. A general page for RadioMail is radiomail.app.

> This version provides support for configuring and using digipeaters, useful when connecting to far-away Winlink gateway stations. Digipeaters are special stations that receive and sequentially re-broadcast digital data on the same frequency, extending the range of communications. You can now specify up to two digipeaters to use when connecting to a station in packet or VARA FM mode.
>
> …
>
> Legacy TCP packet TNC
>
> In a previous update, RadioMail also added support for legacy TCP packet TNC that are not discoverable via DNS-SD. In case you missed it, if you have a TCP/IP KISS TNC that's available on the same network as your iPhone, you can now simply enter the hostname or IP address and port for that device and RadioMail will use it in packet mode.

While I haven't yet purchased RadioMail, it appears to be a pleasant-looking app for sending and receiving Winlink messages on an IOS (Apple) device. At first glance, this doesn't seem terribly practical as you have to have a Winlink station running to gate messages to or from radio communications. If you use RadioMail via Internet… you don't *really* need Winlink. Upon reading about this update, it struck me that RadioMail is a perfect app as a companion to a Go-Kit set up for Winlink - set up the Winlink Go-Kit, and with RadioMail running on an iPhone or iPad, then you can be untethered to the Go-Kit. For example, if you're operating Winlink at a mass casualty shelter, you can wander around to talk to people with your iPad and compose emails remote from the Go-Kit.

The other use case I can envision for RadioMail is to use it with a portable system such as a portable radio coupled to a portable-friendly modem / TNC such as the TNC4 (see announcement above).

SDRplay is developing SDRconnect, new *cross-platform* software for their units

> A little over a year ago, we decided that to re-develop SDRuno as a true cross-platform SDR solution was practically unfeasible and instead commenced the development of a completely new, 'ground up' solution which we chose to call SDRconnect to distinguish it from SDRuno, which itself will continue to be supported on Windows.

SDRplay is one of my favorite vendors for Software Defined Receivers. That they're putting this much work into supporting their units (and customers) speaks volumes. It's really encouraging that they're doing cross platform, especially for the Raspberry Pi 4 and 64-bit OS.

Updata

Angry Radio Relay League (YouTube)

HamRadioNow talks with Ria Jairam N2RJ regarding her recent censure by the ARRL Board of Directors for writing a book about preparing for the Technician exam. In my opinion, it's worth hearing the story directly from N2RJ.

OTA Micro-Blogging concept update

> There's been substantial progress made on the OTA Micro-Blogging concept. Paul Offord [M0PXO?] has made a python utility that integrates with JS8Call through its TCP/UDP API. The following playlist has my original concept and the Proof of Concept videos of Paul's Python utility running with JS8Call.
>
> Paul says the Python code, and a more detailed description of the server, are available at PaulOfford/mbserver: Microblog Server (github.com) He would also be very interested in thoughts and feedback on the utility.
>
> Paul shared his work on the JS8Call groups.io page. That thread can be found here. https://groups.io/g/js8call/message/21506

Paul Elliott WB6CXC also pointed this out to me in Zero Retries 0083 Comments. WB6CXC offered one of the best software commentary I've read in a long time:

> The JS8 code is all open-source, but it (and the original wsjtx code) is a twisty maze of passages, all alike.

Zero Retries Poll

Feedback Loop

Via email:

- Re: My plea in Zero Retries 0084 for folks to dig out copies of W5YI Report and get them to DLARC for archiving and sharing…
    - Kay Savetz K6KJN used his Internet Archive Ninja-like skills to find a few copies (already on Internet Archive) of the "Dits & Bits" versions of The W5YI Report that were posted to CompuServe.
    - Steve Roberts N4RVE shared his favorite issue of W5YI Report - 1991-11-15, which featured an interview about N4RVE's magnum opus, the BEHEMOTH "bicycle".

- Re: Has anyone come up with a way to grab 28 MHz of spectrum and decode FT8 on all [HF] bands simultaneously? Seriously, this should be a thing., Martin Rothfield W6MRR pointed me to:
  Multiband FT8 transceiver
  This project implements a standalone multiband FT8 transceiver with all the FT8 signal processing done by Red Pitaya in the following way:
    - *simultaneously record FT8 signals from eight bands*
    - *use FPGA for all the conversions needed to produce .c2 files (complex 32-bit floating-point data at 4000 samples per second)*
    - *use on-board CPU to process the .c2 files with the FT8 decoder*
- See also Red Pitaya Notes for other Software Defined Radio projects with the Red Pitaya. I regularly find impressive projects based on the Red Pitaya.
- W6MRR also pointed out:
  SparkSDR
  Cross platform sdr application for Hermes Lite and Open HPSDR compatible radios (Red Pitya, Apache labs) and SDRplay. Runs on Windows 7+, Linux x64, linux arm(rpi) and Mac.
    - *Run multiple radios at a time each with as many receivers as they support.*
    - *Built in digi modes (PSK31, WSPR, JT9, JT65, FT8, FT4, FST4, FST4W) no need for virtual audio or serial cables.*
    - *Virtual receivers that allow many modes to be monitored at once. This shares the bandwidth of as many slice receivers as the radio has between multiple modes.*
- Re: Discussion of using Motorola CDM1550 mobile radios for building a 222-225 MHz repeater, Sean Zellers KD9CFO commented:
  It is possible to program them as wide band units but you have to get the correct mix of software to do it. I have notes regarding this as it's really weird. You have to install two of the programming programs but use a specific one of the pair. I have mine running at 35 watts instead of the low power 20 or high power 45 however it is the middle of winter and has been very cold in the shed where they are running. I will be going back to 25 watts low power this summer. I don't notice much difference in range when testing. I have a pair of the CDM1550s running a DMR repeater in Northern Illinois, the only Brandmeister DMR and from what I can tell the only DMR in this area.

Join the *Fun* on Amateur Radio

If you're not yet licensed as an Amateur Radio Operator, and would like to join the fun by *literally having a license to experiment with radio technology*, check out
Join the Fun on Amateur Radio for some pointers.

Closing the Channel

In its mission to highlight technological innovation in Amateur Radio, promote Amateur Radio to techies as a literal license to experiment with wireless technology, and make Amateur Radio more relevant to society in the 2020s and beyond, Zero Retries is published via email and web, and is available to anyone at no cost. Zero Retries is proud *not to participate* in the Amateur Radio Publishing Industrial Complex, which hides Amateur Radio content behind paywalls.

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- Tina Stroh KD7WSF for, well, *everything!*
- Pseudostaffers Dan Romanchik KB6NU and Jeff Davis KE9V for continuing to spot, and write about "Zero Retries Interesting" items on their blogs that I don't spot on my own.
- Amateur Radio Weekly consistently surfaces "Zero Retries Interesting" stories.
- Andreas Spiess HB9BLA's YouTube channel - HB9BLA Wireless features Zero Retries Interesting content.
- Matthew Miller M0DQW's YouTube channel - Tech Minds features Zero Retries Interesting content. It's subtitled Ham Radio - SDR - RF Projects - Software - Tutorials.
- If you like the content of Zero Retries, I recommend Experimental Radio News by Bennet Z. Kobb AK4AV. ERN discusses (in detail) Experimental (Part 5) licenses issued by the US FCC.
- The Substack email publishing platform makes Zero Retries possible. I recommend it for publishing newsletters.

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Zero Retries / N8GNJ on Mastodon

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More bits from Steve Stroh N8GNJ:

- SuperPacket blog - *Discussing new generations of Amateur Radio Data Communications - beyond Packet Radio (a precursor to Zero Retries)*
- N8GNJ blog - *Amateur Radio Station N8GNJ and the mad science experiments at N8GNJ Labs - Bellingham, Washington, USA*

Thanks for reading!
Steve Stroh N8GNJ / WRPS598 (He / Him / His)
These bits were handcrafted in beautiful Bellingham (The City of Subdued Excitement), Washington, USA.

2023-02-10

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